UNITED STATES MARINE CORPS
LOGISTICS OPERATIONS SCHOOL
MARINE CORPS SERVICE SUPPORT SCHOOLS
TRAINING COMMAND
PSC BOX 20041
CAMP LEJEUNE, NORTH CAROLINA 28542-0041

STUDENT OUTLINE

BOX AND WAREHOUSE PALLET PREPARATION

LEARNING OBJECTIVES

1. TERMINAL LEARNING OBJECTIVES: Given supplies and equipment to be embarked, necessary tools, equipment, and material, information concerning the type of ship, aircraft, or conveyance to be used, and the references, prepare supplies and equipment for embarkation to ensure compliance with the requirments of the specific type of ship, aircraft, or other conveyance to be used.

2. ENABLING LEARNING OBJECTIVES:

a. Given the references, equipment and supplies to be embarked, determine the quantity of warehouse pallets and boxes required for transportation per the references.

b. Given equipment and supplies to be embarked, identify the requirements for marking pallets and boxes per the references.

c. Given equipment and supplies to be embarked, identify the requiremnts for securing pallets and boxes per the references.

d. Given equipment and supplies to be embarked, identify the reqirements for waterproofing pallets and boxes per the references.

OUTLINE

1. SOURCES OF EMBARKATION PREPARATION ASSISTANCE:

a. Higher Headquarters Embarkation Offices are usually some of the best sources for the who, what, where, why and when of preparation of supplies and equipment for embarkation. Normally, all requests for Packing, Packaging and Preservation (PP&P) (e.g., boxes, packing material, hazardous cargo certification, storage, etc.) are sent via higher headquarters embarkation office. Sometimes the higher headquarters supply office is also involved.

b. Packing, Packaging and Preservation (PP&P) Section, Supply Bn, FSSG is the primary source of PP&P for the Operating Forces. The PP&P section is manned by both Marines and civilians. The Marines normally have the MOS 3052, Packing, Packaging and Preservation Specialist. A newly assigned embarkation officer/NCO should visit the PP&P section as soon as possible to find out the local procedures for obtaining PP&P support. Normally, the PP&P section can provide the following support:

(1) Builds containers (Boxes/Pallets) (Packaging)

(2) Packs containers [e.g., materials requiring special handling (fragile items, hazardous items, weapons, etc.)]

(3) Certifies hazardous cargo (Every battalion/squadron and separate company sized unit should also have a certifier.)

(4) Prepares equipment for storage (Preservation)

c. Air Mobility Command (AMC)/Tanker and Airlift Control Element (TALCE) provides guidance when you are moving by AMC aircraft. AMC is a branch of U.S. Transportation Command that provide operating forces with tactical aircraft for required contingencies and operations. Each MEF (Marine

Expeditionary Force) is affiliated with a TALCE (i.e., McGuire,Travis, and Kadena AFB just to name a few). The TALCE teaches the AMC Affiliation Program "Equipment Preparation Course" and "Load Planners Course." More details can be obtained from your higher headquarters embarkation office. Again, know your affiliated TALCE and make liaison long before it's time to move by AMC aircraft.

2. WAREHOUSE PALLET

a. 48" x 40" Standard warehouse Pallet

(1) Four-way entry

(2) Banding slots

(3) Stringers (LHA longitudinal conveyor compatible)
(4) Recessed separators (Sling compatible)

(5) Can not be easily manhandled. Ideal for units with MHE or that will be co-located with units with MHE (e.g., FSSG units, Division Headquarters, Wing units).

(6) Base for 50 cube pallet box

(7) Pallet boxes over 41" can be a problem when stacking two high in a ISO/ANSI container (max height in most standard ISO containers is 82”) or over 48" when stacking two high on a 463L pallet (max height allowed on 463L pallet is 96”).

b. Pallet boxes fit two high in the following conveyance modes:

(1) MK48 with MK14/18 (LVS), base of 12 and 2 high/24 total.

(2) M923/M925 and M813 (5-Ton), base of 6 and 2 high/12 total. Note, a 5-ton w/ISO bed can carry same amount as the MK14 trailer.

(3) M927/M928 and M814 (5-Ton extra long bed) base of 8 and 2 high/16 total.

(4) M870-base of 16 pallets and 2 high--32 (You can even fit one or two on the goose neck). Note, the M870 is normally reserved for outsized cargo (tracked vehicles and forklifts) but can still carry pallets if needed.

(5) M929/M930 (Dump Truck) base of 6 and one high/6 total. Note, the dump is primarily used for loose soil or rock but can be used for pallets, etc. during embarkation.

c. Pallet boxes also fit into/onto the following conveyances:

(1) 20' ISO Containers [Twenty Foot Equivalent Unit(TEU)

(a) Uniform rows, base of 8 and 2 high/16 total

(b) Irregular rows, base of 9 and 2 high/18 total. Two high only if height under 41"

(2) 463L Pallet

(a) Base of 4 and 2 high/8 total if height is 48" or less

3. EXPEDITIONARY CANS:

a. Have the spout side of the two outboard rows facing outboard (easy filling). Quite often the cans are embarked empty
and are filled from the ship's tanks before they are sent ashore.
Never place the cans two high on the pallet or you will not be able to fill the bottom, center row while the cans are banded to
the pallet.

b. Be sure the cans are flush with the short side of the pallet. This will reinforce the edge of the pallet where the lifting slings are inserted. A field warehouse pallet with 15 full cans weighs 750-850 pounds. This practice of flushing the sides of the pallet also causes the banding material to be flush. Use plywood, etc. (shims) as dunnage in the center of the pallet to get the cans flush with the sides of the pallet.

c. Each pallet must have a pallet board so that it has it's own unique box number. The pallet board should be 12 inches by 12 inches or large enough to contain all appropriate box markings (box markings will be covered later in the class). Pallet boards shall be placed on two sides of the pallet.

4. EMBARKATION BOXES.

a. Pallet Box. The maximum height of a 50 cube pallet box should not normally exceed 43". Realistically, use a maximum height of 40" to allow a 1" error factor. This way they can be stacked two high in an ISO/ANSI container or on 463L pallets. The inside dimensions of a standard ISO container (e.g., inside height and door lip) may vary but the normal inside dimensions is L = 231", W = 92" and H = 87" (not including the door lip). Pallet boxes stacked two high on 463L pallets can be up to 48" high (48" + 48" = 96").

b. Publications Box. There are various sizes of USMC publications boxes. One key is the length should not exceed 40".
This way the box can be placed short-wise on a 48" x 40" pallet
without overhang. Normally, publications boxes measure 40" x 15" x 15" (6 cube). They are ideal for publications and pre-expended bins (PEB) used in some sections or units to expediate embarkation of that sections equipment. Publication boxes can be stacked (3 high) and are banded to a standard warehouse pallet. They can also be stacked with all the open sides facing outboard for use as shelves (e.g., PEB).

5. PACKING CONCERNS.

a. Liquids (Protect leaks with absorbents)

b. Fragile items (Electronic equipment) (Use Labels)

c. Commodity integrity (pack things that will be used together in the same container). Some examples are canteens with
canteen covers or NBC suits with their gloves and booties. Watch
out for hazardous cargo [e.g., Never pack fuzes or propellant with projectiles; blasting caps with C4 or TNT; NBC DS2 with Super Tropical Bleach (STB); etc.]).

6. PACKING MATERIAL.

a. Bubble Wrap (Cushioning)

b. Styrofoam (Cushioning)

c. Foam Rubber (Cushioning)

d. Cardboard, etc (Cushioning)

e. Vermiculite (Absorbent)

f. Desiccant (Dehumidifier)

g. Banding material (Binds together)

7. WATERPROOFING CARGO.

a. Waterproofing supplies and equipment can be accomplished using the following material:

(1) Palstic bags

(2) Watertight inter containers (ammo cans, etc.)

(3) Use watertight outer containers (Insert, PALCON, QUADCON, etc.)

b. Waterproof items that are subject to water damage (e.g., paper items, electronic items, weapons, etc.).

c. Do not waterproof items that are already waterproof or not subject to water damage (e.g., tentage, barb wire, etc.).

d. When using plastic bags, desiccant may have to be used as a dehumidifier (sweat).

e. Painting the exterior of embarkation boxes is a form of waterproofing/preservation for the box contents as well as the box. In a misunderstood cost saving effort, some embarkation SOP's do not require that all embarkation boxes be painted. The practice of not painting embarkation boxes does not save time and money in the long term. If you plan on using the box for what it is designed for "Embarkation", then paint it. It does not take long for a box to crack and warp if it is subject to the elements. Embarkation boxes that are

going to be used for more than one deployment or are going to be stored outside should be painted with a heavy coat (by brush or roller) of USMC green paint. Spray painting embarkation boxes does not fill in the wood's pores like brush or roller painting. Basically the question to paint or not to paint must be decided by the unit based on the anticipated use of the box. An embarkation box should be painted. The cost of boxes/pallets are:

8. EMBARKATION BOXES.

a. 50 cube box is $93 ($68 for material and $25 for labor)

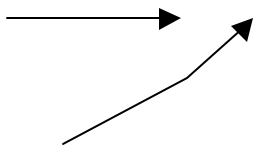
b. 6 cube box is $15.50 ($12 for material and $3.50 for labor)

c. 40" x 48" MIL-P-3938B pallet is $21 (System buy)

Note, cost source is PP&P, 2d FSSG, Camp Lejeune, NC.

EXAMPLE. If a unit takes 100 unpainted 50 cube boxes on a deployment and the boxes are ruined, it will cost $9300 to replace them. A gallon of Marine Corps green paint is about $20 per gallon and you can paint about 4-50 cube boxes per gallon. You will need about 25 gallons of paint x $20 per gallon is $500. You already have the free labor in your units. Use Extra Police Duty (EPD) Marines. Painted boxes will last for many, many deployments. You would not leave the exterior of your house unpainted would you?

9. MARKING. Container (box/pallet) marking is not standard Marine Corps wide. Basically the information marked on the container is the same but the size and color of the marking varies between MARFORLANT and MARFORPAC. There is an ongoing initiative between MARFORLANT and MARFORPAC to standardize the marking procedures. The key is to read the local embarkation SOP (e.g., MARFORLANT/PAC, Division/Wing/FSSG SOP and Rgt/MAG/Bn Embarkation SOP).

UP&TT Line Number (Within Circle)


Stowage Designator 100 (Circle)	5 2351	CU 6 WT
Box/Pallet Number	M52011 Unit Identification Code A002351AA - Field Warehouse #	

EXAMPLE OF PROPERLY MARKED BOX

a. Where. Containers (boxes) are marked on at least 3 sides. Pallets are also marked on 3 sides with pallet boards (a pallet board is a piece of plywood approximately 12" x 12"). Pallets of bulk supplies (e.g., MRE, ammo, etc.) are not normally marked since they do not require a unique identification and are readily identifiable (All MRE pallets look and are alike. Ammo is marked with it DODIC and other information.).

b. What. Containers (boxes/pallet boards) are marked with the following:

(1) **Stowage Designator** is a colored circle (normally 3" in diameter) painted in the upper left corner of the container
(box/pallet board). The colors are:

(a) Yellow specifies cargo that must be accessible to unit personnel during the voyage: **TROOP SPACE CARGO.**

(b) White specifies unit equipment and supplies that must be on the same ship as the unit but need not be readily accessible during the voyage: **HOLD STOWED** on the same ship as the owning unit.

(2) **UNIT PERSONNEL AND TONNAGE TABLE NUMBER (UP&TT#)** is a number that identifies the supplies and equipment by type (e.g., general cargo, POL, ammunition, etc.). JP 3-02.2 provides a list of all UP&TT#s. UP&TT#'s are also found in MDSS II and
CAEMS look-up tables and Users Manuals. The UP&TT# is painted inside the stowage designator circle.

(3) Box/Pallet Number. The box#/pal# is a unique number assigned to each box/pallet. Normally each battalion and squadron size unit issues blocks of box/pallet numbers to its units (e.g., companies, sections and platoons). Check your local Embarkation SOP. The box number is painted directly to the right of the stowage designator.

(a) When a piece of equipment has a serial number, the entire serial number is used in MDSS II and CAEMS.

(b) In the case of bulk supplies the box/pallet number is not marked on box/container (e.g., MRE, barb wire, etc.) since each box/pallet does not require a unique identification. In MDSS II a box/pallet number (package ID) must be entered or the system will generate one automatically.

(4) Cube and Weight. The cube and weight, rounded to the next whole number, is painted in the right corner of the container (box/pallet board).

(a) Cube. The cube is arrived at by multiplying the item, box, container etc. length X width X height divided by 1728 (12X12X12=1728 cubic inches) in whole numbers. Then round the answer to the higher whole cube. i.e. 40X15X15 = 9000 / 1728 = 5.20 or 6 cube. When measuring a container, it is common practice to always round up to the next whole inch. A container that is 40 7/8" today may be 41 1/8" tomorrow. Wooden containers expand and shrink with the weather and/or the nails loosen when the container is moved around. A normal rule-of-thumb for inspections is to allow an error factor of plus or minus one inch.

(b) Weight. The weight is arrived at by actually weighing the container with all of its contents or by using a standard weight for all containers of the same size and cube. If scales are not available, estimating the weight is better than nothing.

(5) Unit Identification Code. Each Force Commander (MARFORLANT/PAC) will be utilize their respective battalion (BN) or squadron (SQ) level **U**nit **I**dentification **C**ode (**UIC**) and **R**eporting **U**nit **C**ode (**RUC**) listed in MCO P1080.20_, preceded by the letter "**M**".

This marking will be placed on embarkation containers and all equipment. Use of UIC/RUC's below the BN/SQDN level is not authorized unless specfically approved by MARFORPAC/MARFORLANT. For battle field security reasons this number is always painted in black (painting the number black does not totally hide the number but makes it harder for the enemy to quickly identify the owning unit). This is especially true when the enemy is trying to identify the owning units of vehicles in a convoy.

(6) Medical Supplies. Refer to local procedures when marking medical supplies. For instance MARFORLANT, to meet NATO
standards used a red cross on three sides of the box with the unit's UIC in the center of the cross. Dental supplies also have the letter "D" in the upper area of the cross.

Note: Special Markings are sometimes used for administrative purposes.

REFERENCES:

1. Joint Pub 3-02.3 Amphibious Embarkation
2. MCO 4030-19G Preparing Hazardous Material for Airshipment